Methods: A vascular disease educational module consisting of 7 hours of traditional lectures and one 2-hour case-centered learning session were devised and administered to second-year medical students. At the completion of the module, all students participated in a survey that evaluated vascular disease-specific knowledge, interest in treating vascular disease, and career choices. Third-year medical students were given an identical survey to serve as a comparison group. Total lecture hours during the first- and second-year medical school curriculum delivered by nonphysicians, nonsurgeon physicians, and surgeons were obtained from medical school records.

Results: Before the introduction of this educational module, 946 total lecture hours were delivered to first- and second-year medical students, 490 hours (52%) were given by nonsurgeon physicians, 445 hours (47%) by nonphysicians, and 11 hours (1%) by surgeons. The survey was taken by 112 second-year medical students and 39 third year medical students. After the vascular disease educational module, second-year students answered 7.1 ± 1.4 of 9 vascular disease questions correctly, whereas third-year students answered 7.2 ± 1.7 questions correctly ($P = .96$). After the module, >60% of second-year medical students reported a "somewhat" or "much greater" interest in the treatment of vascular disease and interest in a vascular surgery or vascular medicine rotation. Subsequent enrollment in the vascular surgery third-year clerkship increased by threefold for students who had been exposed to the second-year lecture series.

Conclusions: Incorporation of educational modules specific to vascular disease during the second year of medical school allows second-year students to acquire vascular knowledge similar to third-year medical students. Early involvement of vascular surgeons in medical student education has the potential to significantly increase interest in the field.

Intravascular Ultrasound-Assisted Aortic Stent Graft Repair: A Useful Adjunct in Azotemic Patients

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Background: Increased periprocedural complication rates have been reported with chronic renal insufficiency (CRI) and endovascular aneurysm repair (EVAR). This report highlights the efficacy and safety profile of intravascular ultrasound (IVUS)-guided aortic endograft procedures in a group of patients with CRI compared with concurrent patients undergoing IVUS-guided procedures with normal renal function.

Methods: During a 4-year period, 87 patients completed an IVUS-assisted EVAR with implantation of aortic stent grafts to treat aneurysmal degeneration of the thoracic aorta (n = 45), infrarenal abdominal aorta (n = 33), and endoleak after EVAR (n = 9). The two groups, group I (n = 41), with normal renal function (serum creatinine [SCr] <1.5 mg/dL; glomerular filtration rate [GFR] >60) and group II (n = 46), with CRI (SCr >1.5 mg/dL; GFR <60) were compared for periprocedural and late (>30 day) technical success, renal function, endoleak, secondary interventions, and contrast use.

Results: Patient demographics and risk factors were similar between groups, with the exception of diabetes mellitus being more prevalent in CRI patients. SCr was increased in group II compared with group I (2.3 vs 0.9 mg/dL; $P < .0005$). Mean GFR was similarly increased in group II compared with group I (27 vs >60). Mean procedural contrast volume for patients with CRI was 26 mL vs 100 mL for patients with normal renal function ($P < .0005$). All procedures were technically successful, with no periprocedural deaths. At the 30-day and 6-month follow-up, no patient had a postprocedural increase of SCr or GFR of >30% of baseline or required dialysis. Two CRI patients with SCr levels of 5.1 and 4.1 mg/dL did move to dialysis at the 12- and 18-month follow-up. One secondary procedure was done to treat a distal endoleak in a thoracic endograft, and one type II lumbar endoleak is being monitored in an abdominal aneurysm repair, with a mean follow-up for the group of 24 months.

Conclusion: IVUS-assisted EVAR is practical and demonstrates comparable outcomes to procedures performed with contrast angiography. Technical advantages of IVUS-guided EVAR include a comprehensive assessment of aortic anatomy that is useful for appraisal of the proximal and distal landing zones and in the selection of stent graft sizing. Use of IVUS provides an additional margin of safety to the patient with CRI because it aides in minimizing the exposure to nephrotoxic contrast agents.

Blunt Traumatic Aortic Injury: Revisiting the Role of Medical Management in the Endovascular Era

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Background: Traumatic aortic injury (TAI) is a rare yet highly lethal injury associated with blunt force deceleration injury. The adoption of thoracic endovascular aortic repair (TEVAR) has become a safer option than traditional open repair; however, the timing of such repair is still debatable. This study reviewed a rural trauma center experience with TAI in which prolonged time to definitive care is a major factor.

Methods: A retrospective analysis was performed of all patients who presented with TAI between 2000 and 2009. Electronic records, including clinical, demographic, operative, and anatomic variables of all cases were systematically reviewed. Clinical end points included injury grade as previously described, follow-up time, death, and aortic-related death. The study population was divided into two groups, individuals who underwent open or endovascular surgical repair (SR) and those managed medically (MM).

Results: Complete data were available for 56 patients who presented with blunt TAI, of which 35 (62.5%) were SR (22 open, 13 TEVAR) and 21 (37.5%) were MM. With the exception of coronary artery disease, the patient comorbidity profiles were not statistically different. Mean hospital arrival time to the trauma center between the SR and MM groups was not significantly different (188.6 ± 30.3 vs 253 ± 65.3 minutes, respectively). Aortic injury grade between the two groups was not significant (2.7 ± 0.1 and 2.3 ± 0.2, respectively). Injury severity score (ISS) and abdominal abbreviated injury score (AIS) were not significant between the groups. Head injury score was worse in the MM group, whereas chest injury score was worse in SR group ($P < .05$). There were nine (42.9%) deaths in the MM group and only two (5.7%) in the SR group ($P < .001$). One MM death (9%) was attributed to aortic injury, and the remaining 10 (91%) were due to multisystem trauma. Mean follow-up was 453.3 ± 109.2 days the SR group and 299.9 ± 91.4 days in the MM group. Long-term survival was 57% in the MM group and 94% in the SR group.

Conclusion: These data provide an aortic injury grade-matched group of patients to examine the acute natural history of TAI in the endovascular era. The low aortic-related mortality in the MM group demonstrates that it is not necessary to perform immediate operative intervention in patients sustaining TAI. Further investigation should evaluate whether patients with delayed presentation of blunt TAI should initially be considered for medical management with subsequent staged and well-planned endovascular treatment, rather than immediate surgical repair.

Clinical Outcome Trends of Type B Aortic Dissections in South Carolina

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Background: Aortic dissection is the most common pathology of the aorta. Stanford type B dissections are associated with significant morbidity and mortality. During the last 10 years, the incidence of acute myocardial infarction and stroke has decreased nationally. This study evaluated the incidence, treatment, and outcome trends for patients admitted to South Carolina hospitals with Stanford type B aortic dissections.

Methods: Current Procedural Terminology and *International Classification of Diseases* (9th ed) codes were used to identify patients admitted with type B aortic dissection in the South Carolina Office of Research and Statistics (SCORS) database and the Greenville Hospital System Department of Surgery Vascular Database, which was interrogated for medical comorbidities, length of stay, procedures performed, hospital readmissions, and in-hospital mortality. Age-adjusted incidence rates were calculated for each year and compared using a pooled population of all 11 years. The Cochrane-Armitage test for linear trend was used to evaluate trends in cumulative incidence rates and proportions during the study period.

Results: From 1997 through 2007, 890 patients (55.8% men) were admitted to hospitals in South Carolina with type B aortic dissections. Patients were 59.9% Caucasian, 36.7% African American; 51.6% were aged >65 years, 44.9% were 35-64 years, 3.5% were 18-34 years. Admissions for type B aortic dissections per 100,000 South Carolina adults (≥18 years) rose from 2.41 in 1997 to 2.74 cases ($P = .004$) in 2007, representing a 14% increase in the incidence of type B aortic dissections. Hypertension was the most commonly associated comorbidity, with an average incidence of 79% during the 11-year study period. Other commonly reported comorbidities included coronary artery disease, 22.5%; chronic obstructive pulmonary disease, 14.4%; and tobacco abuse, 6.4%. The average hospital length of stay was 7.8 days for the 11 years studied. Hospital cost per stay has trended upward from $20,519 in 1997 to $112,268 in 2007, which represents a 547% increase. During the study period, 12-month in-hospital mortality rate averaged 20.5%, ranging from a low of 13% in 2007 to a high of 29% in 1998, which did not represent a significant trend ($P = .089$). The trend in the number interventions per patient per year ranged from a low of 0.13 in 2000 to 0.55 in 2007, averaging 0.35 interventions per patient per year ($P = .055$). Endovascular procedures comprised 47 of the 312 interventions (15.1%) performed during the time period studied. The proportion of open surgical interventions decreased from 1997 to 2007 ($P < .001$), indicating a significant rise in the use of endovascular treatments. The open procedures were 117 unspecified bypasses (44.2%), 73 open thoracic aortic repairs (27.5%), 48 open abdominal aortic repairs (18.1%), 14 open thrombectomies (5.3%), 12 peripheral artery bypasses (4.5%), and 1 aortomesenteric bypass (0.4%). Of the endovascular procedures, 19 (40.4%) were endovas-